

Symptoms of ADHD are Related to Education and Work Experience Among Incarcerated Adults

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Abstract: *Several reports document increased prevalence of attention deficit and hyperactivity (ADHD) and similar symptoms in incarcerated members of the community. Such conditions have been associated with employment, educational outcomes, and development of anti-social behaviour in the general population. Little is known about how these symptoms are related to education and work experience in incarcerated adults. A study among Norwegian prison inmates reveals that 60 % report signs of ADHD. In the present study a sample of 600 inmates incarcerated in Norway completed a questionnaire including the WURS-k (Wender Utah Rating Scale, short form) and questions to survey completed education level and work experience. A clear relationship was found between the WURS-k score and earlier job experience, with increased probability of ADHD associated with work experience from low socio-economic status jobs. The scale scores were also found to share variance with reported education history, as higher education reduces the probability of ADHD. Thus, the WURS-k could be a useful screening instrument in education assessment of incarcerated populations.*

Keywords: *ADHD; incarcerated adults, adult education, special needs education; work experience*

Introduction

The present study focuses on self-reported symptoms of attention deficits and hyperactivity (ADHD) and how such symptoms are related to education and work experience in a sample of incarcerated adults in Norway. Several reports emphasize that the prevalence of ADHD is increased among prison inmates (Dalteg, Gustavsson, & Levander, 1998; Rasmussen, Almvik, & Levander, 2001; Rösler et al., 2004), and theoretical perspectives also emphasize ADHD and similar neuro-cognitive deficits as risk factors for development of anti-social behaviour and later criminal behaviour (Moffitt, 2006). In addition, ADHD has an impact on education and employment (Barkley, Fischer, Smallish, & Fletcher, 2006; Mannuzza, Klein, Bessler, Malloy, & Hynes, 1997), and knowledge about the prevalence of ADHD may have implications for program planning and also for classroom and schedule planning (Abramowitz & O'Leary, 1991; Appelbaum, 2008). However, little is known about how symptoms of ADHD are related to education and work experience among incarcerated adults, and the implications of

such conditions for planning and calibration of education in prisons.

What is ADHD?

Attention Deficits and Hyperactivity (ADHD) is described as a syndrome consisting of symptom clusters of inattention, impulsivity and hyperactivity (DSM 5, American Psychiatric Association, 2013). The disorder is classified as a pervasive developmental disorder. The symptoms should be present before age twelve, and there should be clear evidence of clinically significant impairment in social, academic, or occupational functioning. However, the requirement of a diagnosis before age twelve imposes problems for diagnosing ADHD in adults, in particular when assessment has not been conducted in pre-school age. Necessary background information from family or school records are frequently unavailable for incarcerated adults as impaired family relations and school dropout frequently are seen as additional problem situations. In addition, problems of ADHD may not be represented identically in adults as in children, as also are seen in follow



up studies of adults who were diagnosed as children. To meet this arguments, Wender (1995) proposed a set of criteria, the Utah Criteria, for diagnosing ADHD in adults. First, there should be a childhood history consistent with ADHD (although a diagnosis is not required). Adult symptoms should include hyperactivity and poor concentration, and in addition two of the following: affective lability (hot temper; inability to complete tasks and disorganization), stress intolerance or impulsivity. ADHD continues into adulthood in a large proportion of those diagnosed as children (Rösler & Retz, 2006). Neuropsychological deficits are seen in adults with ADHD across several domains of functioning, with notable impairments in attention, behavioural inhibition, and memory (Balint et al., 2008; Hervey, Epstein, & Curry, 2004).

Attention deficits and delinquency

Developmental trajectories of disruptive behaviours are often described as life-course-persistent and adolescent-limited antisocial pathways (Moffitt, Caspi, Harrington, & Milne, 2002). Profound neurocognitive impairments, in particular impairment in spatial and memory functions, are described in males on the life-course-persistent antisocial pathway. Likewise, these boys show increased prevalence of ADHD as 31.8 % of the life-course-persistent participants were diagnosed, compared to 14.8 % of the controls. The adolescent limited group were even lower, with 11.8% (Raine et al., 2005). It is now recognized that a large proportion of children with ADHD have persisting symptoms into adulthood (Barkley et al., 2002; de Graaf et al., 2008; Müller et al., 2007). The exact persistence rate is not known, but the prevalence of adult ADHD has been reported between 1.2 and 7.3 % (de Graaf et al., 2008), and 49 to 66 % of childhood cases complained of significant symptoms or met the diagnostic criteria for the disorder at adult age (Barkley et al., 2006). Studies have shown that adults with ADHD have both a high load of symptoms and significant functional impairment (Barkley et al., 2006; Gjervan, Torgersen, Nordahl, & Rasmussen, 2012; Mannuzza et al., 1997). Young and colleagues also found ADHD as a major factor explaining disruptive behaviour problems in personality disturbed offenders (Young, Gudjonsson, Ball, & Lam, 2003). On the other hand, it has not been documented that ADHD alone is related to increased criminal behaviour except in the context of conduct disorder (Mordre, Groholt, Kjelsberg, Sandstad, & Myhre, 2011).

There are few studies available addressing the prevalence of ADHD in adults in general, and in particular we lack reliable figures for populations of incarcerated

adults. However, de Graaf and colleagues, based on the WHO World Mental Health Survey Initiative, found that 3.5 % of workers in the 10 participating countries were estimated to meet the DSM-IV criteria for adult ADHD (de Graaf et al., 2008). Persistent ADHD is common among prison inmates. Out of a sample of 82 Norwegian inmates, 46 % scored in the ADHD window (on WURS25) and an additional 18 % in the borderline window for an ADHD diagnosis (Rasmussen et al., 2001). ADHD was also found in two thirds of a sample of 80 serious recidivist juvenile offenders in Sweden (Dalteg et al., 1998; Dalteg & Levander, 1998). In a sample of German inmates, the overall prevalence of ADHD according to DSM-IV was found to be 45 %, which is significantly elevated when compared to non-delinquent controls. Generally, the population of young adult male prison inmates exhibits a considerable psychiatric morbidity. 64 % suffered from at least 2 disorders, and only 8.5 % had no psychiatric diagnoses (Rösler & Retz, 2006, 2008). This is seriously increased figures compared to the 3.5 percent estimate reported in the general population.

ADHD is, however, not the only source of attention deficits and agitated behaviour among prison inmates. Intoxication and abstinence, atypical affective disorders, and high risk behaviour with probable brain injuries before conviction could cause similar symptoms (Raine et al., 2005; Rasmussen et al., 2001; Ward, Wender, & Reimherr, 1993). In addition, conduct disorder is another diagnostic category with considerably overlap with incarceration in juvenile samples (American Psychiatric Association, 1994) where antisocial behaviour and criminality are among the main diagnostic criteria. Therefore, it should be of no surprise that there is also found a considerable overlap between conduct disorder and ADHD in US juvenile prisons (Eme, 2008).

The right to education

The rate of imprisonment for the total population in Norway is approximately 72/100,000 (Kriminalomsorgen, 2013). According to Norwegian law, prisoners are entitled to access to education in the same manner as other citizens and residents. This implies seven years of obligatory primary school (age 6-13), and three years of obligatory lower secondary school (age 13-16). In addition the law also assures the right to three years of upper secondary school (age 16-19), which has three main branches of general, mercantile, and vocational programs. Prisons in Norway have adopted the so-called import model (Christie, 1970; Karsikas et al., 2009) for delivery of services to the prisoners (i.e.,

the normal school system will supply educational services in prison). Recent studies reveal that more than half of the prisoners in Norway participate in education while incarcerated (Eikeland, Manger, & Asbjørnsen, 2013). As activity participation is mandatory during incarceration in Norway, those who do not participate in education will have to participate in prison work or specific programs (e.g., programs for sexual offenders, aggression reduction programs etc.)

Can signs of ADHD predict earlier education and work experience?

Not many studies have addressed the relationship between symptoms of ADHD, incarceration and job experience. However, Moffitt and colleagues (Moffitt, 2006), found that males on the life-course-persistent track of antisocial behaviour had increased problems that may be predictive of job life and career, like elevation on psychopathic personality traits, mental-health problems, substance dependence, numbers of children, financial problems, work problems, and drug-related and violent crime (Moffitt et al., 2002). These traits may also interact with academic skills and the ability to complete education. In an early study, Mannuzza and colleagues reported findings from a prospective follow-up of boys with ADHD, and found that they, as young adults, on the average had two years less formal schooling, and had lower ranking occupational positions than controls. These findings were not related to other comorbid psychiatric diagnoses (Mannuzza et al., 1997). When Gjervan and colleagues followed a sample of 149 adults with confirmed ADHD diagnosis, they revealed that only 22.2% had ordinary work as their source of income, compared with 72% in the general population. The most prevalent comorbid disorders were lifetime depression (37.8%), substance abuse (28.1%), and alcohol abuse (23.3%). They concluded that Adult ADHD was associated with lower educational attainment and lower level of employment. Later age of first central stimulant treatment and higher inattentiveness ratings were associated with lower level of employment (Gjervan et al., 2012). When addressing adult outcome of hyperactive children, Barkley *et al* reported lower educational performance and attainment as 32% had failed to complete high school. Those with a childhood history of ADHD had been fired from more jobs and showed lower job performance than the controls. Severity of lifetime conduct disorder was predictive of several of the most salient outcomes (failure to graduate, earlier sexual intercourse, early parenthood), whereas attention-deficit/hyperactivity disorder and oppositional defiant disorder at work were predictive

of job performance and risk of being fired (Barkley et al., 2006). ADHD is also found to include comorbidity with other psychiatric conditions, like disruptive behaviour, substance use, mood and anxiety disorders, oppositional defiant disorder, and conduct disorder, which also may interact with learning and education (McGough et al., 2005). We have less information on how attention deficits stemming from other psychiatric conditions interfere with the requirements of education (Balint et al., 2008). In addition, conditions that can be associated with incarceration and conduct disorder, such as sensation seeking and high risk behaviour may have led to blows to the brain and minor brain damage (Raine et al., 2005). Excessive alcohol and drug abuse may also lead to persisting attention and learning problems, and also depressive reactions and abstinence from drug and alcohol may temporarily lead to similar symptoms (Rasmussen et al., 2001; Rasmussen, Stor-saeter, & Levander, 1999). The prevalence of ADHD is frequently reported to be higher among incarcerated adults, and education level is also frequently reported to be lower among incarcerated adults compared to the general population (Dalteg et al., 1998; Eme, 2008; Rasmussen et al., 1999; Rösler et al., 2004). So far we have, however, no good data on how signs of ADHD interfere with education and work career among incarcerated adults.

Screening of ADHD in adults

The *Wender Utah Rating Scale (WURS)* was developed to assess for symptoms of attention deficits among adults, according to the Utah Criteria. The different scales derived from the WURS are based on retrospective ratings of symptoms of attention deficits and hyperactivity present at school age. The scale has been found to be a valid and reliable measure of symptoms of attention deficits, and has earlier been used in similar populations in Norway (Rasmussen et al., 2001).

Several short forms have been constructed based on the original scales and further empirical studies. WURS-36 consists of the items that originally differentiated between ADHD and major depression. In addition, Wender and colleagues also described the WURS-25, the items describing the more obvious symptoms of hyperactivity and attention deficits (Ward et al., 1993). Later, WURS-k was developed to assess ADHD-symptoms among prison inmates (Retz-Junginger et al., 2003; Retz-Junginger et al., 2002).

In an earlier study (Asbjørnsen, Jones, Munkvold, Obrzut, & Manger, 2010), the authors reported good concordance between WURS scores and objective and present measures of attention skills in a sample of 24

incarcerated adults. Others have raised the question of whether there is a systematic relationship between self-reported scores and objective measures of attention (Mackin & Horner, 2005), but they found that poor performance on a digit-symbol task that measures executive functions, response speed and visuomotor coordination were related to elevated scores on the WURS-25.

In the present study we focus on two main questions: Does the WURS-k yield a comparable description of the prevalence of ADHD among the prison inmates in Norway as we have seen from other studies, and can the WURS-k score predict the responders' former education level and work experience?

Method

Participants

Six hundred prisoners in Norway participated as voluntary informants in this survey. During the time of the survey, the prison population of Norway was 3467 (Kriminalomsorgen, 2007). Invitation to participate was determined by geographical location in Norway. The prisons are organized in six regions across the country, and an even distribution of prisons across the country was assured. Further, the chosen sample was balanced with regard to security level (incarcerated in high or low security prisons), and by size of the prison (small < 50 inmates; medium 50 -200 inmates, large > 200 inmates (it should be noted that the largest prisons in Norway have the capacity of slightly less than 500 inmates). A total of 19 prisons with 1682 prisoners received the invitation to participate, and 923 prisoners enrolled. Three hundred and twenty three were excluded due to lack of necessary language skills to complete the questionnaire, giving a total sample of 600 with a response rate of 44.2 percent. Special effort was used to include female participants, as a constant proportion of 5 % female inmates would give a small number and therefore an unreliable estimate of the state among the females, so the final sample consisted of 93 % males, and 7 % females. The mean age of the participants was 34.4 years ($SD= 10.5$), and according to data authority regulations in Norway, all participants were above the age of 18 years. However, young offenders under the age of 18 are rarely sentenced to prison in Norway. The mean level of education was 10.4 years ($SD = 1.9$), equivalent to completed compulsory schooling in Norway. As such, the sample should be representative of the prison population of Norway at large.

Tests and measurements

The present study was a part of a more extensive sur-

vey of the incarcerated adults in Norway. The questionnaire consisted of questions regarding work history, education history; history of convictions and offence for the present conviction; earlier assessment for ADHD and learning problems; self-report of skills and deficits in reading, spelling and mathematics; more general symptoms of psychological problems; dyslexia; locus of control and self-efficacy, in addition to scales for assessment of ADHD-symptoms. WURS-k was used as the only instrument for recording ADHD-symptoms.

The *Wender Utah Rating Scale, short form* (WURS-k, Retz-Junginger et al., 2002) consists of 21 questions from the original WURS-scale regarding behaviour *as a child in school*. The short form was originally developed in German, but was translated to Norwegian and back-translated to German by two independent bilingual Norwegian-German speakers. The items that were included describe the more obvious symptoms of hyperactivity and attention deficits, in addition to items that are related to early development of antisocial, criminal and oppositional behaviour. The items are scored as a five point scale (not at all; very rarely; rarely; sometimes; often; very often) that was allocated numerical scores from 0 to 4 for the statistical analyses. Four of the items are formulated in opposite direction, but were recoded for the summary of the scale score. A cut-off of 30 points yielded a sensitivity of 85 %, and a specificity of 76 % when compared to a formally diagnosed sample, which is clinically acceptable (Retz-Junginger et al., 2003). The WURS-k has shown acceptable specificity and sensitivity among incarcerated adult in Germany (Retz-Junginger et al., 2003; Retz-Junginger et al., 2002) when compared to clinical and formal assessment of ADHD. The scale may, however, be less effective in distinguishing symptoms of ADHD from symptoms of atypical depression, withdrawal and abstinence, and personality disorders. Such symptoms may be frequently found in incarcerated samples (Rasmussen et al., 2001).

Descriptive data for the participants are presented in Table 1.

Results

Validity assessment of the WURS-k gave a Cronbach's $\alpha = 0.92$, indicating a high internal consistency of the scale. The average item to scale sum correlations was $r=0.53$, varying from $r=-0.48$ to $r=0.80$, as four of the items are responded in the opposite direction, but all items contribute significantly to the variance of the scale.

The average scale score for the WURS-k in this sample of incarcerated adults was 35.2 points, which is

Table 1

Descriptive data for the participating sample

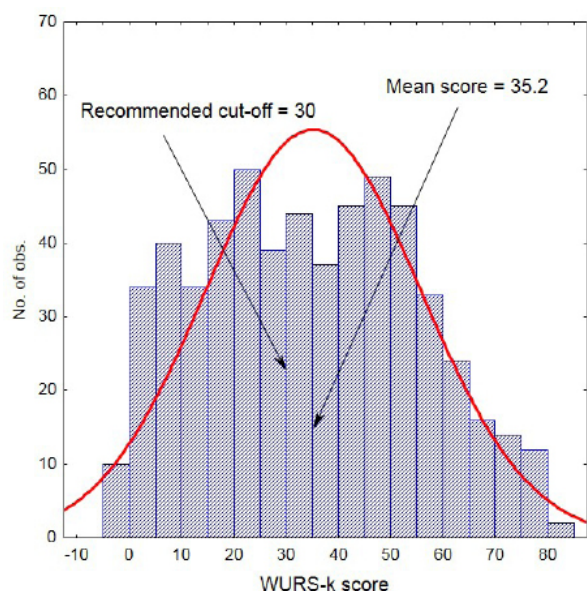
	Valid N	Mean	Std.Dev.
Age	591	34.4	10.5
ADCL	597	6.4	4.7
WURS-k	571	35.2†	20.5

† = above recommended cut off of 30 points

Abbreviations: ADCL = Adult Dyslexia Checklist; WURS-k = Wender Utah Rating Scale, short form

significantly above the recommended cut-off for considering ADHD ($t_{(570)} = 6.04, p < 0.001$) analysed with a single sample t -test. More than half (56.2 %) of the

Figure 1 . The Distribution of Scores on the WURS-k Scale. As Can Be Seen, the Mean Score of The Sample is Above the Recommended Clinical

*Cut-Off Value of 30 Points, and the Distribution is Slightly Bimodal.*

participants in the present study obtained a WURS-k score of above 30, which is suggested as the cut-off

score for an ADHD diagnosis. This is higher than expected from normative prevalence studies, where approximately half of those diagnosed as children were found to continue to show symptoms into adult age, and also a slightly elevated prevalence estimate compared to other studies among incarcerated adults.

One hundred and thirteen participants (19.8 %) reported that they had been diagnosed with ADHD earlier, either as a child, or later as an adult. Ninety eight participants (17.2 %) reported that they had earlier been diagnosed with ADHD and showed an elevated score on the WURS-k scale. Fifteen participants (2.6%) reported that they had been diagnosed earlier, but did not show an elevated score on the WURS-k scale in the present study. However, 223 participants obtained elevated scores on the WURS-k scale, but reported that they had not been referred for assessment of attention deficits, or had received a diagnosis of ADHD (see table 2). The participants with WURS-k score above threshold had on the average less work experience [8.15 years ($sd = 7.8$) vs. 15.3 ($sd = 11.7$), $t_{(525)} = 8.38, p > 0.001$]. They were also on the average younger [30.5 ($sd = 8.5$) years vs 36.7 ($sd = 14.7$) years, $n.s.$] compared to participants with lower score on the WURS-k.

For the further analyses we used a categorization of

Table 2

Frequency of participants reporting symptoms of ADHD on the WURS-k Scale, compared with frequency of participants reporting they have been diagnosed with ADHD

	nADHD	ADHD
Diagnosed with ADHD?	Yes	98
	(2.6 %)	(17.2 %)
	No	223
	(41.2 %)	(39.1 %)
All Grps	250	321
	(43.8 %)	(56.2 %)

$$\chi^2 = 53.27, df = 1, p < .005$$

the participants above or below the cut-off score for WURS-k as the independent variable, and analysed for the probability of simultaneously being a member of other sub categories based on type of offence, work experience, or completed education, as the dependent variables.

ed for property offences and driving under the influence was as expected from the distribution of participants with a high or a low score on the WURS-k (see Table 3). These frequency differences yielded a significant effect ($Pearson \chi^2 = 14.1$, $df = 3$, $p < 0.05$). In addition, 79 % of the high WURS-k respondents re-

Table 3

WURS-k Classification and offence

	nADHD	ADHD	Totals
Violence	64 (13.4 %)	113 (23.6 %)	177 (37.0 %)
Sexual offence	16 (3.4 %)	7 (1.5 %)	23 (4.8 %)
Drug related offences	59 (12.3 %)	75 (15.7 %)	134 (28.0 %)
Driving under influence	22 (4.6 %)	25 (5.2 %)	47 (9.8 %)
Property offences	52 (10.9 %)	45 (9.4 %)	97 (20.3 %)
All Grps	213 (44.6 %)	265 (55.4 %)	478 (100 %)

$$\chi^2 = 14.25, df = 4, p < .05$$

WURS-k score and offending

The next analyses were directed toward disentangling the relationship between increased score on the WURS-k scale and type of offences the participants reported to be convicted for. The χ^2 analyses revealed that the observed frequency of being convicted for violence or drug related offences was increased above the expected with high scores on the WURS-k. The observed frequency of being convicted for sexual offences was slightly reduced, and the frequencies of being convict-

ported they had been convicted earlier, as opposed to 55 % of the low responders. This is also a significant effect ($Pearson \chi^2 = 34.6$, $df = 3$, $p < 0.05$).

Many of the participants with elevated WURS-k scores reported they had been referred to assessment for reading and spelling difficulties ($\chi^2 = 24.8$, $p < 0.005$) or mathematics difficulties ($\chi^2 = 23.4$, $p < 0.005$), either in primary or in secondary school. Following this, the number of participants with high scores on WURS-k who reported to have been diagnosed with learning dif-

Table 4

WURS-k Classification and Self-Reported Reading, Spelling and Mathematics Skills

	Reading	Spelling	Mathematics
ADHD	147(70)	180 (70)	248 (69)
nADHD	43(19)	65 (19)	124 (14)
χ^2	61.1	79.1	75.6

Figures in brackets indicate number of participants reporting they had been diagnosed with impaired skills within reading, spelling or mathematics. In Norway, reading and spelling skills are usually combined in diagnostic work, as one implication of the close resemblance between graphemes and phonemes ("shallow orthography").

facilities within these areas were also increased compared to those with a low score on WURS-k [Mathematics ($\chi^2 = 28.1, p < 0.005$; reading and spelling skills ($\chi^2 = 22.4, p < 0.005$)].

When the participants were asked to report if they experienced problems with their reading, spelling or mathematics skills, a large discrepancy between the number of participants who experienced lack of skills, and the number of participants who reported they had

ported they had had more demanding jobs like running their own business or having a job demanding higher education (professional work). As WURS-k was not found to correlate with general abilities or learning skills, it is supposed to have a unique contribution to accumulation of work experience. Log linear analysis of the interaction between the WURS-k classification and the different categories of work experience resulted in a good fit with the data (Pearson $\chi^2 = 0.384, df$

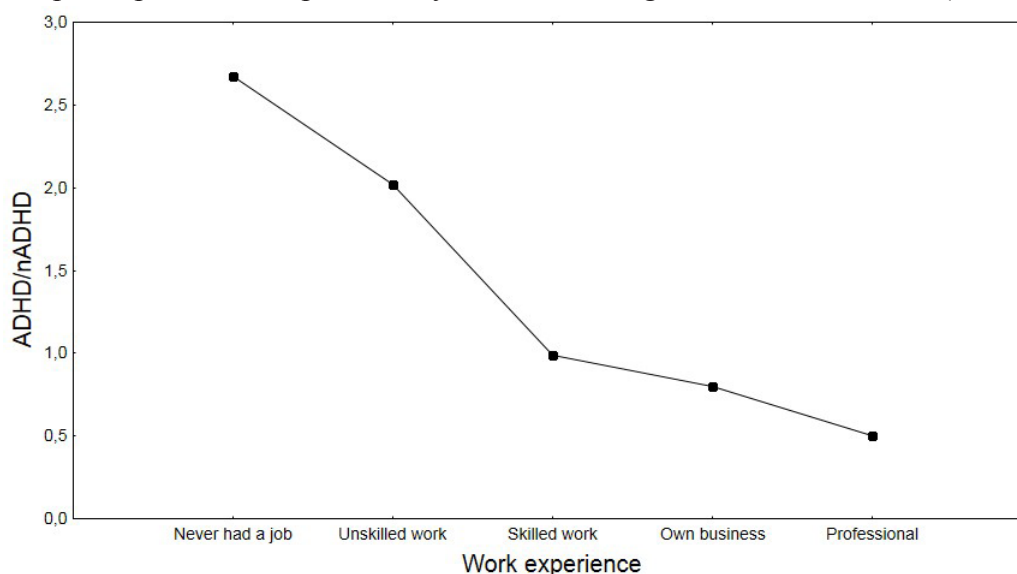


Figure 2: Ratio of participants with and without ADHD within each job experience category.

actually been referred and had received assessment of their skills appeared (see Table 4).

The WURS-k score was related to work experience, as the high WURS-k participants are overrepresented among inmates without work experience and unskilled jobs, but were underrepresented among those who re-

ported they had had more demanding jobs like running their own business or having a job demanding higher education (professional work). As WURS-k was not found to correlate with general abilities or learning skills, it is supposed to have a unique contribution to accumulation of work experience. Log linear analysis of the interaction between the WURS-k classification and the different categories of work experience resulted in a good fit with the data (Pearson $\chi^2 = 0.384, df$

Table 5

WURS-k Score Classification and Completed Education

Group	Primary		Secondary			Tertiary	
	Old, 7 years	New* (9/10 ys)	1. year	2. year	Completed three years	Vocational	University/college
ADHD	11	27	133	76	33	28	8
nADHD	45	191	98	76	48	41	31
ADHD/nADHD	0.24	1.42	1.36	1	0.69	0.68	0.26
χ^2	33.5	7.2	n.s.	n.s.	9.04	7.7	21.5

($\chi^2 = 34.12, df = 5, p < .001$)

*= New Primary Education in Norway was introduced in 1997, when the primary school was extended from 9 to 10 years as school start was lowered to six years of age. Participants who report to have completed 7 years primary school were born before 1985.

relationship was found for the proportion when considering the different levels of education demanding jobs (see Figure 2). Figure 2 shows the ratio of participants scoring above the threshold of 30 on the WURS-k (ADHD) compared to the number of participants scoring below the threshold (nADHD) as a function of variation in work experience. Nearly three times (2.67) as many high scorers compared to low scorers reported to never have had a job and twice as many reported to have had unskilled work. This difference disappeared for those who reported to have been working as skilled workers, and for the more complex job situations, like running one's own company or being employed in jobs with a demand for higher education (professional work). Approximately half of the members of the latter group yielded WURS-k scores equivalent to belonging to the ADHD-group (see Table 5). This also gave a significant effect ($\chi^2 = 52.17$, $df = 4$, $p < 0.001$) (see Figure 2).

Further, the WURS-k was also related to level of completed formal education. For those who reported to leave school after the obligatory 9/10 years of elementary school, three out of five returned a WURS-k score similar to an ADHD diagnosis. Among those who reported to have completed three years of upper secondary ("senior high school"), half of them yielded a score above the clinical cut-off. For those who reported some higher (tertiary) education or a completed degree, only one in four produced a WURS-k score above the clinical cut-off. These differences gave a significant effect ($\chi^2 = 34.12$, $df = 5$, $p < 0.001$) (see Table 5).

A small subsample ($n = 56$) of participants reported the old Norwegian 7 years elementary school as their highest education, and they also had low scores for WURS-k, as only 20 % ($n = 11$) of this group report increased WURS-k score. This ratio is equivalent to what is seen in the group reporting some higher education, but considerably lower compared to the 58.7 % with scores above cut-off in the group reporting elementary school as their highest education. One possible explanation may be the higher age in this group.

Discussion

The first important finding of the present study was an increased estimate of prevalence of attention deficits and hyperactivity in this sample of incarcerated adults, compared to what was expected from population studies (de Graaf et al., 2008). However, the finding is in line with studies using self-report scales in prison populations (Dalteg et al., 1998; Dalteg & Levander, 1998; Rasmussen et al., 2001; Rösler et al., 2004). The average score of the self-report measure that was

used in this study, the WURS-k, was above the cut-off recommended for clinical screening purposes, and this criterion has been found to yield high sensitivity and specificity in earlier clinical studies in similar populations (Retz-Junginger et al., 2003). This indicates an increased prevalence of ADHD, suggesting an estimated prevalence of 56.2 % of the incarcerated adults showed significant signs of ADHD. Only approximately one third of those who achieved a score above the recommended cut-off score were earlier diagnosed with ADHD. This is also in line with results from clinical assessment of incarcerated adults in a Norwegian prison (Stokkeland, Fasmer, Waage, & Hansen, 2014), showing that 35 % of inmates referred for assessment fulfilled the criteria when a comprehensive assessment was conducted, although the majority reported symptoms in accordance with the diagnosis both in childhood and as adults.

We have no objective measures to claim they all qualify for the formal diagnosis, as this is based on a retrospective self-report, without confirmation from other sources of information. As the WURS-k score is strongly correlated with presented attention skills (Asbjørnsen et al., 2010), we can expect the results to at least show impaired attention skills and lack of cognitive control in this group. However, as earlier discussed, the impaired attention performance may also be related to other frequently seen conditions among incarcerated adults, like affective disorders, drug abuse or abstinence from drug use, that will complicate the diagnosis of ADHD among prison inmates (Rasmussen et al., 2001). Elevated scores on the WURS-k were associated with increased chances of being convicted for violent offences, but otherwise no obvious differences were seen when comparing the two subgroups, which is also in line with earlier studies (Mordre et al., 2011).

A very small proportion of the Norwegian population is incarcerated (approximately 72/100,000), and we could expect that a major portion of our participants have shown a developmental trajectory that overlaps with what Moffitt and colleagues call "life-course-persistent antisocial behaviour" (Moffitt, 1993, 2006). Earlier research does suggest increased prevalence of neurocognitive impairments among the life-course-persistent group (Moffitt & Caspi, 2001; Moffitt et al., 2002; Moffitt & Lynam, 1994; Raine et al., 2005), that can explain the rather high prevalence of ADHD-symptoms in the present sample.

A second important finding was that the WURS-k score was associated with self-reports of work history, as a high score on the scale was found to be associated with earlier unemployment and lack of work experi-

ence. If the high responders reported job experience, it was mainly related to unskilled or other low SES work (see Figure 2), and more rarely they reported experiences from work that require higher education or independent work. This is also in line with studies showing challenges to career as a function of ADHD symptomatology (Barkley et al., 2006; Bliko, 2008; de Graaf et al., 2008; Gjervan et al., 2012). In addition to the effects of the ADHD symptoms on occupation, our sample will also face the additional challenge of being an earlier convicted person when approaching the labour market following release. This further emphasises the importance of closing the educational gap to increase employability on re-entry to society.

Further, the score on the WURS-k was related to earlier education, as the number of participants scoring above the clinical cut-off diminished as each level of education was completed (Table 5), also suggesting a longer history of similar impairments, and early drop-out for participants who reported increased symptomatology in the present study. Approximately two thirds of the sample (70 %) reported that they have not completed upper secondary education. For the population at large, approximately 72 % completes upper secondary school and continues to tertiary (higher) education (Eikeland et al., 2013).

Even though the analyses did not reveal shared variance between the WURS-k score and basic reading skills, self-reported reading and spelling skills and also perceived weaknesses within these fields were clearly associated with increased WURS-k score. In addition a large proportion of the sample with increased WURS-k score also reported that they had been referred for assessment of learning problems and attention deficits earlier in their lives. This does indicate that the problems have persisted through a significant part of their development, and could also be taken as support for the assumption that the prevalence of ADHD in this sample of incarcerated adults is higher than population estimates. However, as no additional confirmation of the occurrence of the symptoms during school age is available, one should be cautious to conclude that these findings represent a valid documentation of increased prevalence of ADHD among the incarcerated adults. As we have discussed, several conditions can be associated with incarceration and conduct disorder: Sensation seeking and high risk behaviour may have led to blows to the brain and minor brain injuries that can explain impaired attention functions. Excessive alcohol and drug abuse may also lead to persisting attention and learning problems, and depressive reactions and abstinence from drug and alcohol may temporarily

lead to similar symptoms (Rasmussen et al., 2001; Rasmussen et al., 1999).

We found no differences between the high and low responders when they were compared on willingness or motives for approaching education during the incarceration. Education is one of the options offered during incarceration in Norway, along with programs for coping with some of the associated disposing conditions for the offence, like drug management programs, anger management, social skills training, sexual offender programs, or a diversity of production work programs. However, the motivation for education may change through the course of incarceration, as push factors, like getting away from the boredom of the cell, are substituted with pull factors like willingness to learn, competence building or concern for the future (Costelloe, 2003; Manger, Eikeland, Diseth, Hetland, & Asbjørnsen, 2010).

The probability of meeting a student with pronounced attention impairments in prison education is quite high, as an estimated prevalence rate of 25-59 % has been frequently reported across countries. In particular, if the student has a major deficit in formal education, the probability of impaired attention skills is quite high. This has implications for teaching and program delivery. First of all, teachers working in this setting need a minimum of competence in special needs education to be able to guide students with attention problems appropriately.

The high prevalence of ADHD has implications for prison education, as this will directly influence the study situation for the students in prison education. As Appelbaum (2008) concluded following a study on persons with ADHD in incarceration, even if medication may be a good option for adults with ADHD, it is not a cure, and treatment options for ADHD in correctional settings, as in community settings, may include nonpharmacologic interventions. Education about the disorder can help ease frustration, enhance self-esteem, and teach organizational skills. Group therapy with other inmates who have ADHD can have similar benefits. A willingness to participate in these activities provides an indication of the inmate's investment in treatment. In contrast, the absence of a meaningful commitment of time and energy should call into question the inmate's degree of distress and need for medications and possibly the diagnosis itself (Appelbaum, 2008, p. 1522).

For students with ADHD firm structuring of the tasks and the work environment to decrease distraction will be of help. Preparation for program participation and mentoring of the students should include guidance in how the work can be planned to reduce the impact of

the attention problems. Such guidance may reduce frustration and increase behavioural control (Knivsberg, Reichelt, & Nodland, 1999). Several intervention programs based on behavioural management techniques have been developed to assist the learning situation for students with ADHD (Reiber & McLaughlin, 2004), including modification of classroom structure, modification of schedules, teaching modifications, peer interventions, and token economies, in addition to self-management. As inattention, distractibility and impulsivity are the core signs of ADHD, planning of the classroom and the schedule to reduce the impact of ADHD on the performance is probably the least intrusive and single most important intervention approach (Abramowitz & O'Leary, 1991). A few studies lend support to mindfulness training increasing control over behavioural problems and attention skills in adults with ADHD (Edel, Hölter, Wassink, & Juckel, 2014; Zylowska et al., 2008), and they even show a tendency to give better results than more established skills training based on dialectical behaviour therapy (Edel et al., 2014). Probably interventions aiming to increase mindfulness could be a supplement to regular teaching activities for adults with ADHD.

In the present study, we addressed signs of ADHD as they appear in a self-report scale, and not as a clinically confirmed diagnosis. This investigation did not allow for access to school or health records to confirm the present findings and this will of course yield uncertainty to whether the function profile described in the paper is equivalent to a clinically confirmed diagnosis of ADHD, or whether they reflect attention deficits and agitated behaviour ("hyperactivity") of a different aetiology. But based on earlier findings, the WURS-k score yields a strong correlation with present attention skills (Asbjørnsen et al., 2010), and as such should give a valid measure of skills important for an educational setting.

To conclude, a sample of unselected incarcerated adults showed increased symptoms of ADHD, and these symptoms were related to completed earlier education and work career, as the majority of those who reported signs of ADHD had lower formal education and limited or low SES work experience. As prisons are important arenas for adult education and also constitute opportunities for the community to close the educational gap between those who end up in prison and the population at large, teachers working in the prison setting need to be aware of the special education needs that may be excessive in the student group they meet, and to plan the teaching and study work accordingly.

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